

# Evaluation of Team-Based Learning Activity Delivered To a Group of Respiratory Care Students

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## Abstract

**Background:** The purpose of Team-Based Learning (TBL) is to deepen students' higher cognitive skills and to produce teams that are dynamic and interactive. **Aim:** The aim of this study is to determine respiratory care advanced level students' learning experiences with team-based learning (TBL) at a Saudi Private Education University. **Materials and Methods:** The investigator observed the students during a TBL session, and after the session students filled, a survey composed of biographical data and quantitative and qualitative questions focusing on student learning experiences about the session. **Results:** Before the session students appeared to have no negative perception of team-based learning. Observation during the session revealed high students' interaction. Following the session, students had a positive experience and found TBL valuable and more useful than traditional lecture methods. Students enjoyed working in teams, during group readiness assessment and application, and they recommended using team-based learning in more courses. **Conclusion:** The results of this study showed TBL as an effective teaching strategy to stimulate active learning and teamwork skills among students and should be offered in more courses in respiratory care curriculum to strengthen and promote problem-solving and decisionmaking skills among respiratory care graduates.

**Keywords:** Active learning; Learning experiences; Respiratory care; Team-based learning

## Introduction

Traditional lecture methods are instructor-centered and discipline-oriented resulting in students becoming passive learners who mostly recall some of the course contents. [1] When we compare TBL to traditional lectures, having small group approach as the basic different from other instructional methods used in higher education, TBL produces more interaction and student centeredness. [2] The purpose of team-based learning (TBL) is to deepen students' higher cognitive skills and to produce teams that are dynamic and interactive. [3] Larry Michaelsen developed TBL in the 1970s when he, too, was facing the same problems many lecturers today are experiencing with traditional lecture methods: low class attendance, low student engagement in class, low value of lectures because they are perceived as boring, and small group work resulting in an opportunity for top achieving students to dominate group activities. TBL as extensively described and detailed in publications by Michaelsen and other scholars in the field of health professions education. The of TBL is to ensure that students are more engaged with course content rather than simply recalling facts before an assessment or examination. [4] To apply TBL as an effective instructional method in any program, it is required to redesign all targeted courses, and redesigning should start enough time before the commencement of the academic year or term, and in a way that suits the new teaching and learning strategies. The teaching and learning activities will be modified at four different occasions during implementation: in the planning stage before launching the first session, when starting each major unit of instruction, and just before concluding the course. TBL

methodology comprises three stages: (a) advanced preparation by the students, (b) the Individual Readiness Assessment Test (IRAT) and the group Readiness Assessment Test (GRAT), and (c) application, which includes whole-class discussion and reasoning. [5] The primary goal of TBL is to support a high level of learning, improve the application of learning at both the quantitative and qualitative levels, and support the development of students' interpersonal and teamwork skills. In traditional instruction, the class is centred around the instructor and this minimizes student the interaction between students and compromises student centeredness. On the other hand, during TBL sessions students are rendered accountable to the session instructor and other team members for their performance. In addition to the individual accountability, group members should have cumulative accountability as one team. [6] However, Kazory and Zaidi reported that, first year medical students showed a preference and satisfaction with TBL over traditional lectures noticed a mixed response on the questions pertaining to accountability for team learning. [7] A study by Letassy and his colleagues, pharmacy students, perceived TBL to be more effective and engaging, and they recommended expanding TBL use in other courses in an undergraduate pharmacy program. [8] Previous studies describe faculty preference for TBL due to

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increased student interaction despite requiring increased time for design. [9]In our program setting, traditional lectures are the main teaching method and TBL is not an official teaching and learning strategy, but there are efforts to introduce many active learning strategies including Problem Based Learning (PBL), Project Based learning and TBL . The aim of this study was to evaluate a one-day team-based learning activity delivered to a cohort of respiratory care students.

## Methods

A cross-sectional design was used for the current study. The study has been approved by the ethical committee at King Saud University to conduct the study (4/67/352673). All participants were informed of the purpose and procedure of the current study. Consent forms were signed by all players who agreed to participate in this study.

### Study setting

We conducted this study during the second semester of the academic year in the Department of Respiratory Care, College of Applied Sciences.

### Study design and participants

This was a descriptive, cross-sectional quali-quantitative study. All level seven respiratory care students taking the Cardiology and Electrocardiography Course (RSTH330) took part in a one-day team-based learning activity about ischemic heart disease (IHD), then all participants filled a questionnaire to evaluate the TBL session.

### Study instrument and procedure

During the TBL session, the investigator observed students during group readiness assessment and application, to assess communication and interaction between team members and between different teams. After the session, all participants filled an 11 quantitative questions questionnaire focusing on students' learning experiences about the TBL session. Students scored on a four-point Likert scale ranging from zero to three (3: strongly agree; 2: agree; 1: disagree; 0: strongly disagree). The 12 items have a maximum score of 36. Education experts reviewed the survey for content validity, and to give their opinion on aspects such as the clarity and distinctness of the questions, the length of time needed to complete the questions, biased questions, and any other suggestions and/or recommendations. The main predictor variables were the gender, and cumulative grade point average (CGPA).

## Statistical analysis

We coded the questionnaire items for the study participants and analysed the data using the Statistical Package for the Social Sciences (SPSS) program. We applied descriptive statistics were to get the frequencies and percentages of the five subscales.

## Ethical Considerations

The department of Respiratory Care approved this study. Before the study, the objectives, steps, and the study questionnaire were explained to the students participating in the study, and they were assured their data would be kept confidential. After the TBL session, student filled the anonymous electronic questionnaires sent to them through mail.

## Results

Thirty-two students participated in the TBL session and responded to the questionnaire. Twenty of the study participants were females (62%), 29 students were Saudi (64.3%) and 22 were low achievers (69%) with a CGPA less than 2 (Table 1).

The investigator observed that students were actively involved in discussion, during both the group readiness-assessment test and the group readiness-assessment discussion. Most students (65%) denied that they had any negative perception of TBL after the instructor introduced them to it at the start of the session (Q1, Table 2). Just less than 50% of the students admitted that they usually prepare in advance for classes, however about three quarters of the participants mentioned that, Knowing they would discuss their opinions during the TBL session motivated them to prepare in advance (Q2 & Q3 Table 2). Regarding engagement in discussions during sessions, more than half of the participants (59.4%) agreed that they used to feel sleepy during traditional lectures, but close to three quarters of the students (72.4%) agreed that TBL increased their participation in the class discussion (Q4 & Q5 Table 2). Ninety-one percent of the students reported they already work in team with their peers, and a similar percentage of participants agreed on their full contribution during the TBL session (Q6 and Q7 table 2). Regarding enjoying the different parts of the TBL session, 65% – 75% of the participants agreed that they enjoyed the individual readiness assessment test (Q8/ 2), group readiness assessment test (Q9/ Table 2), and group readiness assessment (Q10/ Table 2). Generally, 72.7% students recommended that TBL should be adopted used as teaching method in more courses in the respiratory care curriculum (Q11/ Table 2).

**Table 1: Students Characteristics – Gender, Nationality, and CGPA.**

	N	(%)
<b>Gender</b>		
Males	12	37.5
Females	20	62.5
<b>Nationality</b>		
Saudi	29	90.6
Non-Saudi	3	9.4
<b>CGPA*</b>		
Low achievers	22	69
High Achievers	10	31

\* CGPA Cumulative Grade Point Average

Low achiever = CGPA ≤ 2, high achiever = CGPA > 2

**Table 2: Results of the Team-Based Learning (TBL) Survey on Students' Learning Experiences.**

	Percentage n (%)			
	Strongly Agree	Agree	Disagree	Strongly Disagree
<b>Negative Perception about TBL</b>				
Q1 I use to have a negative perception about team-based learning before this session	2 (6.0)	9 (28.0)	16 (50.0)	5 (15.6)
<b>Preparation in advance for classes</b>				
Q2 I usually prepare in advance for lectures in most of my courses.	2 (6.0)	13 (39.2)	14 (45.4)	3 (9.4)
Q3 Knowing I would discuss my opinions during this TBL session motivated me to prepare in advance	7 (22.7)	18 (56.3)	6 (18.8)	1 (03.0)
<b>Engagement during sessions</b>				
Q4 I am more likely to feel sleepy during traditional lectures than during this session.	3 (9.4)	16 (50.0)	11 (34.5)	2 (6.0)
Q5 This session increased my participation in the class discussion.	3 (9.4)	20 (63.0)	7 (22.7)	2 (6.0)
<b>Working in teams</b>				
Q6 I usually work well as a participant in a team with my peers.	9 (28.0)	20 (63.0)	1 (3.0)	2 (6.0)
Q7 I contributed fully to my team's work in this session.	6 (18.8)	23 (71.8)	3 (9.4)	0 (0.0)
<b>Experience with this TBL session</b>				
Q8 I enjoyed the use of individual readiness assessment test	5 (15.6)	16 (50.0)	5 (15.6)	6 (18.8)
Q9 I enjoyed the use of group readiness assessment test	6 (18.8)	16 (50.0)	6 (18.8)	4 (12.5)
Q10 I enjoyed the use of the group readiness assessment discussion	6 (18.8)	18 (56.3)	5 (15.6)	3 (9.4)
Q11 Team-based learning should be used in more courses in the RC curriculum	7 (22.7)	16 (50.0)	4 (12.5)	5 (15.6)

## Discussion

The aim of this study was to evaluate a one-day team-based learning activity delivered to a cohort of respiratory care students as a part of undergraduate electrocardiography and cardiology course. In our program setting, traditional lectures, laboratory sessions, and bedside teaching are the main instruction methods, and TBL is not an official teaching and learning strategy, but there are efforts to introduce many active learning strategies including PBL, TBL, and flipped class. Student observation during this TBL session, showed interaction, and teamwork, which are among the most important benefits and objectives of TBL implementation compared to traditional methods of teaching. [1-3] Student knowing they would discuss their opinions during the TBL session motivated them to prepare in advance, this indicates their increased commitment and accountability and this represents the important principle that in TBL sessions students are rendered accountable to the session instructor and other team members for their performance quantity and quality. In this study, we conducted a typical TBL session as described in the literatures, with its principal three stages, which aims to support the development of students' interpersonal and teamwork skills. Having 90.6% of the participants agreed on their full contribution to their teams during the TBL session is promising and supports the results by Kazory and Zaidi about the first year medical students who showed a preference and satisfaction with TBL over traditional lectures. It is rewarding that students perceived TBL to be more effective and engaging and recommended using TBL in more respiratory therapy courses and these results support a previous study among pharmacy students by Letassy and his colleagues. Although this study did not include teacher's perception towards the use of TBL, many previous studies described faculty preference for TBL due to the increased student interaction despite requiring increased time for design. Because of the small number of

students who participated in the TBL session, it is not possible to test the effect of gender, nationality, or student achievement level on the participants' responses to the survey questions. A larger study, that includes both students and teachers' opinions is required as a baseline before we officially implement TBL in our undergraduate respiratory care program.

## Conclusion

The results of this study showed TBL as an effective teaching strategy to stimulate active learning and team work skills among students and should be offered in more courses in respiratory care curriculum to strengthens and promote problem solving and decision making skills among respiratory care graduates.

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